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20995	7590	11/16/2010	EXAMINER	
KNOBBE MARTENS OLSON & BEAR LLP			EOFF, ANCA	
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IRVINE, CA 92614			1722	
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			11/16/2010	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/561,830	<b>Applicant(s)</b> HAYASHI ET AL.	
	<b>Examiner</b> ANCA EOF	<b>Art Unit</b> 1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 17,22 and 24-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17,22 and 24-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. Claims 17, 22 and 24-28 are pending. Claims 1-16, 18-21 and 23 have been cancelled.
2. The foreign priority documents JP 2003-189707 filed on July 01, 2003 and JP 2004-119498 filed on April 14, 2004 were received and acknowledged.

### ***Continued Examination Under 37 CFR 1.114***

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 14, 2010 has been entered.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 17, 22 and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujishima et al. (US Patent 6,239,231) in view of Hada et al. (WO

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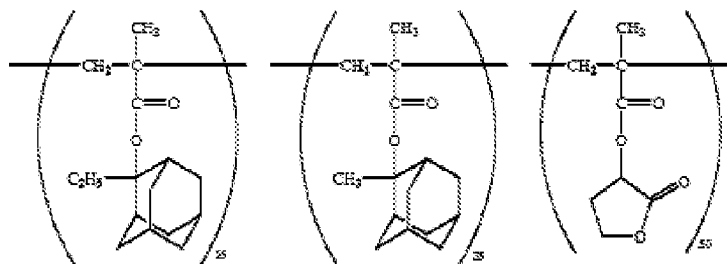
03/048863, wherein the citations are from the English equivalent US Pg-Pub 2004/0058269).

With regard to claim 17, Fujishima et al. disclose a chemical amplifying positive resist composition comprising a resin, an acid generator and a solvent (abstract, column 9, lines 1-15).

The acid generator of Fujishima et al. is equivalent to the "acid generator (B) that generates acid on exposure" of the instant application.

The solvent of Fujishima et al. may be an organic solvent (see column 9, lines 1-15) and it is equivalent to the "organic solvent (C)" of the instant application.

Fujishima et al. further teach the resin of formula (I):



(I) (resin I in columns 15-16).

The 2-alkyl-2-adamantyl groups in the first and the second repeating units of the resin (I) are cleaved by the action of an acid so the resin becomes alkali soluble (column 5, lines 46-53). The resin (I) is equivalent to the "resin component (A) that exhibits increased alkali solubility under action of an acid" of the instant application.

The resin (I) comprises:

- a first unit of 2-ethyl-2-adamantyl methacrylate which is equivalent to the unit (a1) of the instant application;

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- a second unit of 2-methyl-2-adamantyl methacrylate which is equivalent to the unit (a2) of the instant application, as shown in the copolymer (A) on page 29 of the specification, and

- a third unit equivalent to the unit (a3) containing a lactone group of the instant application.

Fujishima et al. further teach that the resin may also comprise a 3-hydroxy-1-adamantyl (meth)acrylate unit (see column 2, lines 13-18, column 3, lines 11-13), which is equivalent to the unit (a4) of the instant application.

Fujishima et al. teach that the polymerization units of 3-hydroxy-1-adamantyl (meth)acrylate (units (a4) of the instant application) in combination with  $\alpha$ -methacryloyloxy- $\gamma$ -butyrolactone (unit (a3) of the instant application) contribute to the improvement of the resolution of the resist (column 5, lines 43-46).

Fujishima et al. do not specifically teach a copolymer comprising units (a1), (a2), (a3) and (a4). However, it would have been obvious to one of ordinary skill in the art to obtain a polymer comprising the units (a1), (a2), (a3) and (a4) in order to improve the resolution of the resist.

Fujishima et al. teach that the units having groups cleaved by the action of an acid are present in an amount of 30-80 mol% (column 6, lines 23-26), which encompasses the range for units (a1)+(a2) of the instant application.

Fujishima et al. teach that the  $\alpha$ -methacryloyloxy- $\gamma$ -butyrolactone unit may be present in an amount of 20- 70 mol% (column 6, lines 36-39), which encompasses the range for the unit (a3) of the instant application.

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Fujishima et al. teach that the 3-hydroxy-1-adamantyl (meth)acrylate unit may be in amount of 20% or more (column 6, lines 41-43), which overlaps the range for unit (a4) of the instant application.

However, Fujishima et al. do not teach that the copolymer may comprise the unit (a5) of the instant application.

Hada et al. disclose a chemically amplified positive type resist composition comprising a resin (A) (par.0012), which may be a copolymer comprising:

- (a1) a unit derived from a (meth)acrylate ester comprising an acid dissociable, dissolution inhibiting group ;
- (a2) a unit derived from a (meth)acrylate ester comprising a lactone group;
- (a3) a unit derived from a (meth)acrylate ester comprising a hydroxyl group containing polycyclic group, and
- (a4) a unit derived from a (meth)acrylate ester comprising a polycyclic group (par.0012).

The unit (a1) of the Hada et al. is equivalent to the first and second units of the resin (I) of Fujishima et al.

The unit (a2) of Hada et al. is equivalent to the third unit of the resin (I) of Fujishima et al.

The unit (a3) of Hada et al. is equivalent to the 3-hydroxy-1-adamantyl (meth)acrylate unit of Fujishima et al.

Hada et al. teach that by incorporating each of the units (a1) to (a4), the resin enables an improvement in the depth of focus of an isolated resist pattern, reduction in

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the proximity effect and as result enables formation of a resist pattern which is faithful to the mask pattern, for both sparse and dense patterns (par.0017).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the unit (a4) of Hada et al. to the resin of Fujishima et al., in order to obtain a resin which enables an improvement in the depth of focus of an isolated resist pattern, reduction in the proximity effect and formation of a resist pattern faithful to the mask pattern (Hada et al, par.0017).

The unit (a4) of Hada et al. is equivalent to the unit (a5) of the instant application. Hada et al. further teaches that the unit (a4) may be present in the resin in an amount of 10-20 mol% (par.0040), which is within the range for the unit (a5) of the instant application.

With regard to claim 22, Fujishima et al. disclose that the solvent used for the resist composition may be propylene glycol monomethyl ether acetate (PGMEA), ethyl lactate,  $\gamma$ -butyrolactone or a combination thereof (column 9, lines 1-15). Fujishima et al. specifically disclose a mixture of PGMEA and  $\gamma$ -butyrolactone (column 18, line 67 - column 19, line 1).

With regard to claim 24, Fujishima et al. disclose that the acid generator may be diphenyliodonium trifluoromethanesulfonate (column 6, line 66), which is equivalent to the onium salt with a fluorinated alkylsulfonate anion used as acid generator (B) of the instant application.

With regard to claim 25, Fujishima et al. disclose that the chemical amplifying positive resist composition comprises nitrogen-containing organic compounds, such as amines (column 8, lines 9-56).

With regard to claim 26, Fujishima et al. disclose a process comprising the steps of applying the resist composition to a substrate to form a resist film, drying the resist film, exposing for patterning, performing a heat-treatment and developing with an alkali developer (column 9, lines 16-19).

With regard to claims 27-28, Fujishima et al. disclose that the heat-treatment (post-exposure bake) of the resist composition takes place at temperatures between 80°C and 120°C (see Table 1 in column 18 and Table 2 in column 19). This range overlaps the preferred range of 90-120°C of the instant application, as taught on page 26 of the specification.

The first and the second repeating units of the polymer (I) are equivalent to the units (a1) and (a2) of the copolymer of the instant application (see component (A) on page 29 of the specification).

Therefore, absent a record to the contrary, it is the examiner's position that the heating temperature during the post-exposure bake meets the limitation of claim 27.

### ***Response to Arguments***

6. The Declaration under 37 CFR 1.132 filed on September 14, 2010 is insufficient to overcome the rejection of claim 17 based upon Fujishima et al. (US Patent 6,239,231) in view of Hada et al. (WO 03/048863) because the evidence submitted in



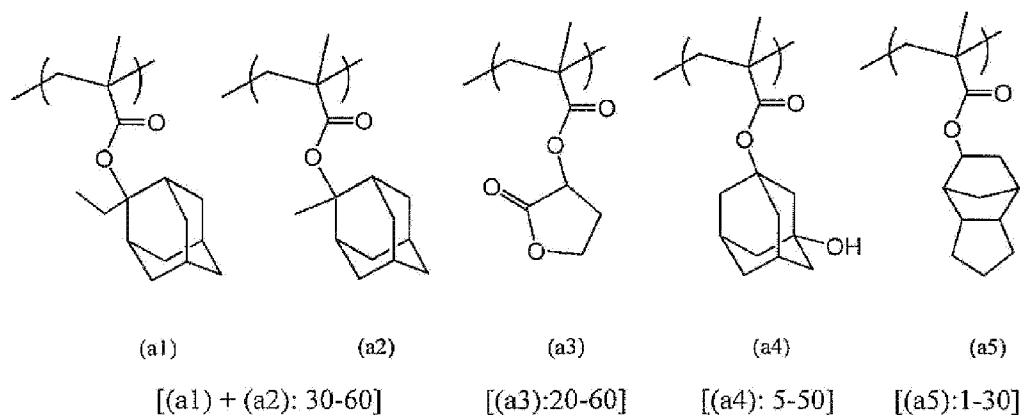
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the Declaration is not commensurate with the scope of claim 17 and does not compare the composition of the present invention to a composition of the closest prior art.

The Declaration shows that a polymer comprising the units (a1), (a2), (a3), (a4) and (a5) in the amounts claimed in claim 17 is dissolved in an organic solvent while a polymer which does not comprise the unit (a5) is not dissolved in the organic solvent (see Table C, page 4).

The applicant concludes that the polymer which does not comprise the unit (a5) requires excess filtration to produce a resist composition and is disadvantageous in practical use (see Conclusion, page 5). However, the applicant does not explain what "excessive filtration" is and does not show any evidence in support of this statement.

The examiner would like to note that the Declaration shows the polymers (A)-1 to (A)-4 which comprise the units:



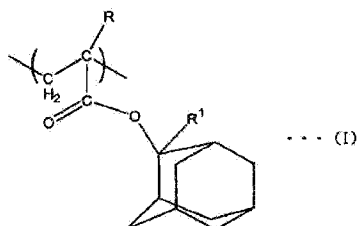
\*Values in brackets indicate the molar percent range recited in claim 17 of the present application

However, the claim 17 recites the limitation of a resin component (A):

a resin component (A) that exhibits increased alkali solubility under action of acid, said component (A) comprising:

- (i) a structural unit (a1), which contains an acid dissociable, dissolution inhibiting group and is derived from a (meth)acrylate ester;
- (ii) a structural unit (a2), which contains an acid dissociable, dissolution inhibiting group that is less readily dissociated than said acid dissociable, dissolution inhibiting group contained in said structural unit (a1), and is derived from a (meth)acrylate ester;
- (iii) a structural unit (a3), which contains a lactone functional group and is derived from a (meth)acrylate ester;
- (iv) a structural unit (a4) which contains a hydroxyl group and is derived from a (meth)acrylate ester;
- (v) a structural unit (a5) containing aliphatic polycyclic group and derived from a (meth)acrylate ester;

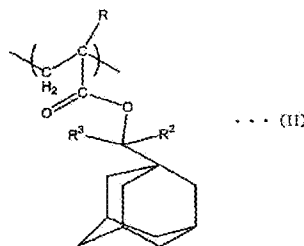
The specification shows that the unit (a1) may be represented by the structures



(I) and (II):

, wherein R<sup>1</sup> may be a straight-chain or

branched lower alkyl group of 2 to 5 carbon atoms (ethyl, propyl, isopropyl, n-butyl, iso-



butyl, tert-butyl, pentyl, isopentyl, neopentyl ) and

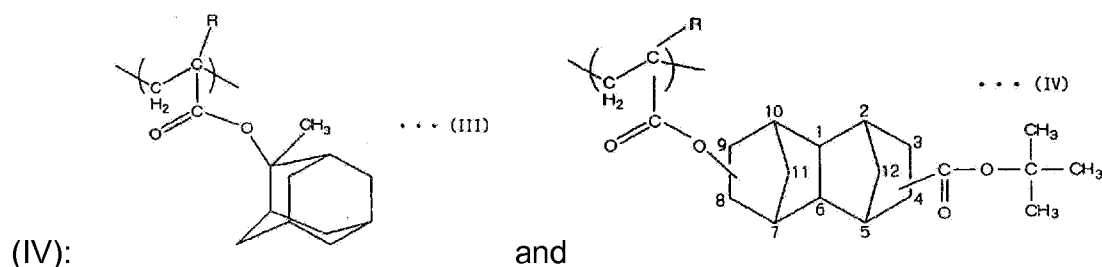
, wherein R<sup>2</sup>

and R<sup>3</sup> are each independently a lower alkyl group of 1 to 5 carbon atoms (methyl,

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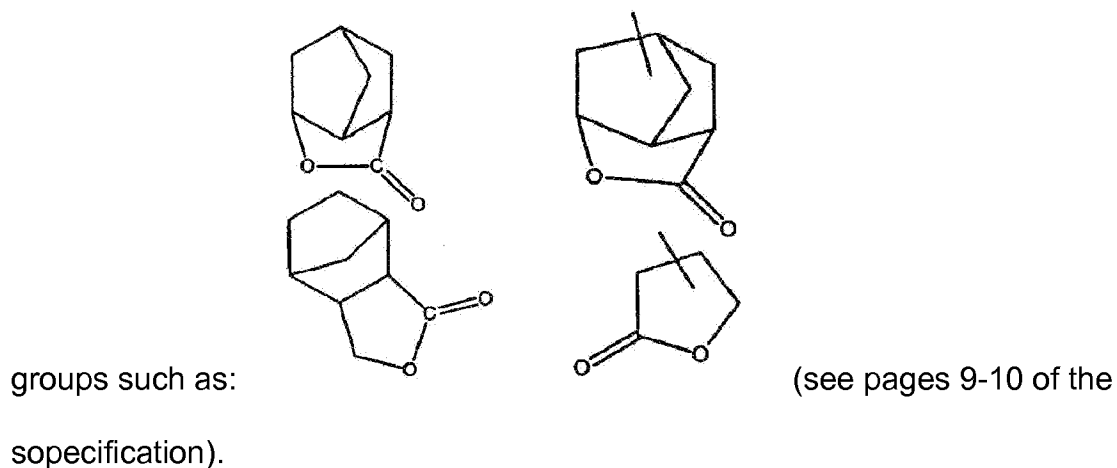
ethyl, propyl, isopropyl, n-butyl, iso-butyl, tert-butyl, pentyl, isopentyl, neopentyl) (see pages 5-8 of the specification).

The unit (a2) may be represented by the structures (III) and



(see pages 5-7 of the specification).

The unit (a3) is derived from a (meth)acrylate ester and may comprise lactone



The unit (a4) is derived from a (meth)acrylate ester and contains a hydroxyl-containing aliphatic polycyclic group, wherein the polycyclic group may be adamantane, norbornane, isobornane, tricyclodecane, tetracyclododecane (see page 12 and page 5 of the specification).

The unit (a5) is derived from a(meth)acrylate ester and contains a polycyclic group, such as tricyclodecanyl, adamantyl, tetracyclodecanyl (see page 15 of the specification).

The specification gives several possible units (a1) to (a5). These units can form a variety of polymers /resin components (A) within the scope of claim 17.

However, the Declaration filed on September 14, 2010 shows *only one polymer/resin component (A)*.

Therefore, the Declaration is not commensurate with the scope of the claims.

The examiner considers that the Declaration is not commensurate with the scope of the claims because the Declaration shows only a polymer solution and not a positive resist composition, as in claim 17.

Additionally, the Declaration does not identify the polymer (A)-3' as representative for the closest prior art (Fujishima et al.) and does not explain the deviation. The polymer (A)-3' in the Declaration is not equivalent to any of the polymers of Fujishima et al.

An affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979). "A comparison of the claimed invention with the disclosure of each cited reference to determine the number of claim limitations in common with each reference, bearing in mind the relative importance of particular limitations, will usually yield the closest single prior art reference." *In re Merchant*, 575 F.2d 865, 868, 197 USPQ 785, 787 (CCPA 1978) (emphasis in original). Where the comparison is not identical with the reference disclosure, deviations therefrom should be explained, *In re Finley*, 174 F.2d 130, 81 USPQ 383 (CCPA 1949), and if not explained should be noted and evaluated, and if significant, explanation should be required. *In re Armstrong*, 280 F.2d 132, 126 USPQ 281 (CCPA 1960) (deviations from example were inconsequential). ( MPEP 716.02(e)-Comparison With Closest Prior Art )

Also, it is not clear why the Declaration shows the solubility after 4 days at room temperature. There is no such requirement in the specification and the applicant does not explain why this experiment is conducted.

The applicant does not explain how the experiment is related to the performance of the positive resist claimed in claim 17.

7. Applicant's arguments filed on September 14, 2010 have been fully considered but they are not persuasive.

The applicant points out that ,after examining the results of the Declaration filed on December 02, 2009, the examiner noted that the comparison between the compositions of the instant application and a composition closest to the prior art do not show unexpected results.

The applicant argues that the evidence in the Declaration filed on September 14, 2010 shows unexpected results of the composition of the instant application: the polymer (A)-1 to (A)-4 which satisfy the requirements of claim 17 are dissolved in an organic solvent while the polymer (A)-3' does not dissolve in the solvent.

The applicant further argues that the Declaration filed on September 14, 2010 shows that the claimed composition exhibits an unexpected advantage over the closest prior art in terms of solubility and freedom from a requirement of excess filtration.

However, there is no definition to show what "excess filtration" means (time required for the filtration, cost of the process, etc.) and no evidence to support this statement.

Also, it is not clear why the Declaration filed on September 14, 2010 shows the solubility after 4 days at room temperature. There is no such requirement in the specification and the applicant does not explain why this experiment is conducted.

The applicant does not explain how the experiment is related to the performance of the positive resist claimed in claim 17.

As shown in paragraph 6 above, the evidence in the Declaration filed on September 14, 2010 is not commensurate with the scope of the claims and does not compare the instant invention to the closest prior art. The Declaration is insufficient to overcome the rejection of claim 17 over Fujishima et al. (US Patent 6,239,231) in view of Hada et al. (WO 03/048863),

On page 5 of the Remarks filed on September 14, 2010, the applicant further argues that, if the same exposure dose is used, the composition of the instant application gives superior results in line width of iso pattern and difference between target size and actual size than the composition comprising the polymer (A)-3' (see Comparative Test Example 3 and Test Examples 3 and 1 of the Declaration filed on December 02, 2009).

The examiner would like to show the following:

Paragraph (1) of the Declaration filed on December 02, 2009 shows that the inferior results are explained by the fact that the polymer (A)-3' does not comprise the unit (a5) of the instant application.

However, Hada et al. (the secondary reference) provides motivation to add the unit (a5) for making a resist pattern faithful to the mask pattern (see par.0017), which is equivalent to a smaller difference between the target size and the actual size.

In view of Hada et al. a lower value of the “actual difference between target size and actual size” is not considered unexpected.

Hada et al. shows also that the resist containing polymers with units (a5) form isolated patterns having lines of 120 nm with good depth of focus (see par.0064, 0074, 0080). These patterns are equivalent to the iso patterns in Table C of the Declaration filed on December 02, 2009.

One of ordinary skill in the art would notice that the addition of a unit (a5) gives the polymer the ability to form isolated patterns with line width of 120 nm with good depth of focus.

The examiner's position is that, in view of the prior art teachings, the results given by the resist composition of the instant application are not unexpected.

The examiner would also like to note that the Table B of the Declaration filed on December 02, 2009 shows that *the polymer (A)-3' dissolves in a mixture of solvents comprising C-1 (100 parts by weight) and C-2 (100 parts by weight)*.

There is no mention of excessive filtration required to prepare a solution of the polymer (A)-3'.

The Table B in the Declaration filed on September 14, 2010 shows that *the polymer (A)-3' does not dissolve in a mixture of solvents comprising C-1 (100 parts by*

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*weight) and C-2 (100 parts by weight) after being allowed to stand at room temperature for 4 days.*

It is not clear why the Declaration filed on September 14, 2010 shows the solubility of a polymer after being left to stand for 4 days at room temperature. It is not explained why this experiment was conducted and how is it related to the features of the positive resist of claim 17.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANCA EOFF whose telephone number is (571)272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a



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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Anca Eoff/  
Examiner, Art Unit 1722